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attention, and within the last few years some systematic attempts at treatment have been carried on.

The results of these experiments, as well as descriptions of the fungus, its history, and the history of the use of fungicides in Switzerland, together with modes of treatment and descriptions of spraying pumps, have been combined into a pamphlet of seventy-three pages, which will serve as an excellent handbook for the treatment of downy mildew. In this country, where mildew is one of the minor troubles of the grape-grower, and is always held in check by treatments for black rot, such a work would be of comparatively little use; but in a country where the question of conquering mildew is of paramount importance, it will be of great value to practical vineyardists. The descriptions of the fungus and methods of treatment are especially adapted to those who look at the subject from a practical standpoint. A noticeable defect in the book is the absence of accurate data. The reader is simply told that one fungicide gave better results than another, or that much or little was saved by its use. A few data as to the weight of the fruit and condition of the vines would add much to the value of these statements. Two fungicides are recommended as best adapted for preventing mildew—Bordeaux mixture and another mixture in which soda is used instead of lime. Accurate estimates as to the cost of the fungicides, and directions for their preparation are given. Some important questions in regard to the latter point were referred to a German chemist, and a few points in his report are worthy of special mention. He advises that the mixtures should always be prepared cold, and that in order to obtain the precipitate in the most finely powdered condition, the more concentrated solution should be poured into the dilute one. He further advises that the copper solution be the concentrated one in both mixtures.—E. A. SOUTHWORTH.

INDEX TO NORTH AMERICAN MYCOLOGICAL LITERATURE.

By DAVID G. FAIRCHILD.

243. ANDERSON, F. W. **A new Fomes from northern Montana** (with plate XII). Bot. Gaz., April 18, 1891, p. 113. Describes *Fomes Ellisianus* on *Shepherdia argentea*.
244. ARMSTRONG, L. H. **Smut and rust fungus.** Florida Dispatch, Farmer and Fruit-Grower, Jacksonville, Fla., May 28, 1891, No. 1165, vol. III, No. 22, p. 429 (2 columns). Gives extracts with comments from bulletins of Kansas Ex. Station in regard to prevention of smut in cereals. (See Nos. 156, 157, 212.)
245. ARTHUR, J. C. **Loose smut of oats.** Bull. 35, vol. II, March 30, 1891, Purdue University, Lafayette, Ind. Ag. Ex. Sta., pp. 81-107. Discusses abundance of disease, recording on the station farm a loss of 18 per cent and estimating the loss in Indiana in 1889 as equaling \$797,526 and in 1890 \$605,352. Describes the hot-water treatment, giving an experiment with 12 lots of seed dipped in hot water of 7 different degrees of temperature from 120° F. to 150° F., which resulted in a decrease of the amount of smut in every case. The tem-

245. ARTHUR, J. C.—Continued.

perature of the water selected as most advisable in practical treatments is 135° F., with time of immersion of 5 minutes. Shows further that the average height of treated seed when full grown is greater than that of untreated, and records experiments upon effect on vitality of seed treated with hot water, showing that the treatment up to a certain point hastens germination in a very remarkable degree, and also that no injury is sustained by treated seed when treated as long as 277 days before planting. Experiments with copper sulphate show this substance to retard germination and decrease the yield, although preventing the smut.

246. ATKINSON, GEORGE F. Black rust of cotton. A preliminary note; Bot. Gaz., vol. xvi, No. 3, pp. 61-65.

246a. ——. Black Rust of Cotton, Bull. 27, Agrl. Ex. Sta., Auburn, Ala., May, 1891, pp. 1-16. Attributes disease to attacks of four parasites, *Colletotrichum gossypii*, South., *Macrosporium nigricantium*, Atkinson (with figs.), *Cercospora gossypina*, Cooke, a species of *Alternaria* and a bacterial organism. Gives history and description of the different forms, with notes upon the current theories as to the cause of the rust; the parts most subject to diseases, power of the plant to resist fungous parasites, and prospective outline of experiments.

247. ——. Some Erysipheæ from Carolina and Alabama (with plate and figs.). Journal Elisha Mitchell Scientific Society, 1890, 7th year, part II (published 1891), pp. 61-74. Offers results of the study of material collected in North and South Carolina and Alabama as a contribution to the knowledge of the Southern forms. Puts the matter in convenient shape for collectors and students, describing genera and species with hosts plants, as follows: *Sphaerotheeca castanei*, Lev.; *S. humuli*, (DC.) Bur.; *Erysiphe communis*, (Wallr.) Fr.; *E. cichoracearum*, DC.; *E. liriodendri*, Schw.; *Uncinula spiralis*, B. & C.; *U. macrospora*, Peck; *U. flexuosa*, Peck; *U. parvula*, C. & P.; *U. polycheta*, (B. & C.) Masse; *Phyllosticta suffulta*, (Rab.) Sacc.; *Podosphaera biuncinata*, C. & P.; *Microsphaera semi-tosta*, B. & C.; *M. diffusa*, C. & P.; *M. vaccinii*, C. & P.; *M. euphorbiae*, B. & C.; *M. Van Bruntiana*, Ger., which the author, in contradistinction to Burrill, separates from *M. alni*, (DC.) Winter, on account of the difference in appendages (with figs.), *Microsphaera quercina*, (Schw.) Burrill; *M. calocladiophora*, Atkinson (*M. densissima*, E. & M.). Jour. Mycology, vol. I, 1885, p. 101.)

248. BESSEY, C. E. An important work on the fungi. American Naturalist, February, 1881, vol. xxv, No. 290, p. 150. Mentions Ellis & Everhart's new work on Pyrenomycetes. (See No. 193.)

249. BJERGAARD, J. PEDERSEN. Prevention of rust in cereals. American Agriculturist, March, 1891, vol. L, No. 3, p. 136. Discusses various methods of treatment with hot water for the prevention of *Puccinia graminis*. Describes it to be prevented by immersing the seed grain for a certain time in warm water of a certain temperature, followed by rapid cooling in cold water. Gives the following instructions: For prevention of rust in barley: "Immerse the seed barley perfectly in cold water for 4 hours; let it stand in wet bags in a cool, not too drying place for at least 4 hours more before the dipping in warm water is to be performed." Finds 123° F. to be sufficiently high temperature for the water to immerse seed grain in. Describes method of dipping as in case of smut of cereals. Concludes for oats, wheat, and rye, the grain may be dipped without previous soaking and that the temperature of the water for oats and wheat must be 133° F., to begin with, and 129° F. at end. Reports temperature of 126° as proving preventive of the rust. Discusses forms of hampers for containing seed. Refers to work of Jensen.

250. BOLLEY, H. L. Grain smuts (with figs.). Bull. No. 1, Agrl. Ex. Station, Fargo, N. Dak., June, 1891. Brings together work of Arthur, Kellerman and Swingle, Jensen, and others upon the subject, using figures from various authors, together with original. Adds much of popular nature to express results obtained by various investigators.

251. BUTZ, GEORGE C. **Black knot on plums (with plates).** Bull. 13, Penn. State Ag. Ex. Sta., October, 1890, p. 34. Instructs orchardists how to eradicate disease by usual methods of pruning.
252. CLARK, JOHN W. **Spraying for codling moth and apple scab** [*Fusicladium dendriticum*, (Wall.) Fckl.]. Bull. 13, Miss. Ag. Ex. Sta., January, 1891, p. 6. Reports good results from use of Bordeaux mixture in treatment of disease.
253. —. **Black rot of the grape** [*Læstadia Bidwellii* (Ell.) V. & R.]. *Ibid.* Gives inconspicuous results from use of Bordeaux mixture in treatment of the disease.
254. —. **Experiments with the Bordeaux mixture upon the grape rot** [*Læstadia Bidwellii*, (Ell.) V. & R.]. Bull. 10, Ag. Ex. Sta., Columbia, Mo., April, 1890, p. 5. Reports saving of 75 per cent of grape crop by spraying with Bordeaux mixture after rot had appeared.
255. COOKE, M. C. **Additions to Merulius.** Grevillea, June, 1891, vol. xix No. 92, p. 108. Describes *Merulius rimosus*, Berk., in Herb. on Alder from New York, collected by J. B. Ellis, No. 586.
256. DIETEL, P. **Bemerkungen über die auf Saxifragaceen vorkommenden Puccinialarten.** Berichte der Deutschen Botanischen Gesellschaft IX. März 23, 1891, pp. 35-45, Taf. III. Gives comparison of species of *Puccinia* on the *Saxifragaceæ*, with numerous references to the North American species, which he decides referable to *P. saxifragæ*, Schlect. (*P. curtipes*, Howe); *P. adoxæ*, DC. (*P. pallido-maculata*, E. & E.); *P. heucherae*, (Schw.). Thinks *P. striata*, Cke., No. 1465 N. A. F., incorrectly determined, while *P. spreta*, Pk. and *P. tiarella*, Pk. are probably identical with *P. heucherae*, (Schw.) and only slightly different from *P. congregata*, Ell. & Hark.
257. ELLIS, J. B., AND ANDERSON, F. W. **New species of Montana fungi** (with figs. and plate). Bot. Gaz., vol. xvi, No. 2, February 15, 1891, pp. 45-49. Describe *Lentinus pholiotoides*, *Helotium Montaniense*, *Volutella occidentalis*, *Sporidesmium sorisporioides*, *Macrosporium puccinioides*, *Acidium liatridis*, *Acidium cleomis*, *Acidium chrysopidis*, *Pestalozziella Andersoni* Ell. & Everh., as occurring in Montana; and (out of place according to title), *Phoma ilicina* and *Coniothyrium ilicinum* up on *Ilex*, and *Dothiorella nelumbii* on receptacle of *Nelumbium*; from Washington, D. C.
258. — AND EVERHART, B. M. **Note sur un Coprin sclératoïde observé à Montana** (with plate). Revue Mycologique, 13 a'n. Jan. 1891, No. 49, pp. 18-20. Traduit par M. O. Debeaux du texte Anglaise. Describes *Coprinus solerottigenus*, n. s. from Montana arising from a sclerotium, although resembling somewhat *C. tuberosus*, Quelet, found in France (see No. 38).
259. FAIRCHILD, D. G. **A few common orchard diseases.** Fancier and Farm Herald, Denver, Colo. Gives popular exposition of more common diseases, with well-known remedies for treatment of same.
260. —. **Diseases of the grape in western New York.** Paper read before the annual meeting of the Western New York Horticultural Society, Rochester, January 28-29, 1891. Proc. 36th Ann. Meeting of Western New York Hort. Soc., p. 76. Same in Garden and Forest, vol. iv, No. 154, February 4, 1891, p. 59. Cultivator and Country Gentleman, Feb. 26, 1891, vol. LVI, No. 1987, p. 169. The Vineyardist, Penn Yan, N. Y., April 1 and 15, 1891, vol. III, Nos. 71 and 72, pp. 490, 497. Vick's Illustrated Monthly Magazine, Rochester, N. Y., vol. 14, No. 3, March, 1891, pp. 98-112. Discusses in a more or less popular way the diseases caused by *Peronospora viticola*, (B. & C.) DBy.; *Uncinula spiralis*, B. & C.; *Læstadia Bidwellii*, (Ell.) V. & R.; *Glaeosporium fructigenum*, Berk.; and *Sphaceloma ampelinum*, DBy. Gives method of treatment of various diseases, and a note upon a new disease in the region similar to the French malady of *Rougeot*.
261. FLETCHER, JAMES. **Black knot of the grape.** Appendix to Report of Minister of Canadian Agricultural Experimental Farm, Ontario, Canada for 1889 (1890):

261. FLETCHER, JAMES—Continued.

Report of Entomologist, p. 87. Notes occurrence near Port Hope, Ontario, of a peculiar cracking of the bark of the grape canes, known among Germans as "Krebs" or "Schorf," and attributed to freezing of the canes.

262. GALLOWAY, B. T. Report of the Chief of the Division of Vegetable Pathology, in Ann. Report for 1890, U. S. Dept. of Agriculture (issued 1891). Treatment of black rot of the grape (see No. 196): Gives results of experiments in Virginia, as described in Journal, vol. vi, No. 3, pp. 89-95. Treatment of pear, cherry, and strawberry leaf-blight as affecting nursery stock: Reports successful prevention of pear leaf-blight by applications of Bordeaux mixture. Finds cherry leaf-blight prevented by either ammoniacal solution of copper carbonate or Bordeaux mixture. Reports successful use of ammoniacal solution in preventing strawberry leaf-blight, giving figures of cost of treatment. Treatment of pear leaf-blight and scab in the orchard: Gives results of comparative test of Bordeaux mixture, ammoniacal solution of copper carbonate, copper acetate (verdigris), and copper carbonate in suspension, with expense of various treatments. Places fungicides as above in order of effectiveness, and finds three early sprayings equally as effective as six continued through the season. Experiments in the treatment of apple scab: Concludes that scab can not be wholly prevented in an unfavorable season by use of ammoniacal solution, Bean's sulphur powder, Mixture No. 5 (equal parts of ammoniated copper sulphate and carbonate of soda), or copper carbonate suspended in water. Finds Mixture No. 5 most effective; early treatment before the opening of the flowers extremely important, and midsummer sprayings of doubtful value. Raspberry leaf-blight: Discloses the fact that raspberry foliage is too delicate to withstand action of Bordeaux mixture or Mixture No. 5; that blackberry foliage, while more resistant than raspberry, is more susceptible than apple. Experiments in the treatment of potato rot: Reports increase in yield of treated over untreated of 25 to 50 per cent. Some practical results of the treatment of plant diseases: Gives figures of expense of treatments made by practical growers. Fungicides and spraying apparatus: Discusses various new fungicides and apparatus. Peach yellows investigation: Gives brief summary of work of Dr. E. F. Smith upon the subject. The California vine disease: Reviews in brief the work of N. B. Pierce, both in the United States and Europe, upon this disease, announcing no definite results. Hollyhock anthracnose [*Colletotrichum malvarum*, (A. Br., & Casp.) Southworth], with colored plate: Gives short statement of the disease affecting greenhouse hollyhocks. Anthracnose of cotton (*Colletotrichum gossypii*, South), with colored plate: Gives brief account of the disease. Ripe rot of grapes and apples (*Glacosporium fructigenum*, Berk.), with colored plate: Short account of the disease described at length in the Journal, vol. vi, No. 4, pp. 164-173.
263. GOFF, E. S. *Bordeaux mixture as a preventive of potato rot.* Rural New Yorker, June 13, 1891, vol. I, No. 2159, p. 453. Gives abstract of report to be published by the Division of Vegetable Pathology upon successful use of Bordeaux as preventive of potato blight. The disease is thought to be different from that caused by *Phytophthora infestans*, DBy, and to resemble the bacterial disease mentioned by Burrill (see No. 188).
264. HALSTED, B. D. *Black rot of the sweet potato* (with fig.). Pop. Gardening, April, 1890, vol. 6, No. 7, p. 128. Gives popular description of *Ceratocystis fimbriata*, Ell. & Hals.
265. ——. *The hydrangea blight.* Garden and Forest, New York, vol. iv, No. 164, April 15, 1891, p. 177 ($\frac{1}{4}$ column). Notes serious abundance of *Phylosticta hydrangeae*, E. & E., in New Jersey. Recommends ammoniacal solution of copper carbonate as preventive.

266. HALSTED, B. D. Mildew of sweet alyssum and radish. *Ibid.*, vol. IV, No. 165, April 22, 1891, p. 189 (4 column). Notices presence of *Peronospora parasitica* on sweet alyssum spread from radishes in greenhouse.
267. —. Decay spots upon leaves. *Garden and Forest*, vol. IV, No. 166, p. 201, April 29, 1891. Remarks *Botrytis vulgaris* previously nourished on blossoms as cause of decayed patches upon many greenhouse plants.
268. —. An abundant rust. *Ibid.*, No. 171, vol. IV, June 3, 1891, p. 262. Notices abundance of *Caoma nitens*, Schw. in 1891.
269. —. The forest in one of its relations to the orchard. *Forest Leaves*, Philadelphia, March, 1891, vol. III, No. 5, pp. 68-70. Notes presence of black knot (*Plowrightia morbosa*) upon various wild species of *Prunus* and of *Gymnosporangium* upon wild *Juniperus*, recommending the destruction of wild species to protect the orchard trees.
270. —. Destroy the black knot of plum and cherry trees (with figs.). An appeal. *Bull.*, 78 Ag. Ex. Sta., New Brunswick, N. J., pp. 1-14. Describes disease popularly, with instruction of how it may be prevented and an appeal for coöperation in its eradication.
271. —. Smut fungi (with figs. from No. 53). *Cultivator and Country Gentleman*, Albany, N. Y., June 18, 1891, vol. LVI, No. 2003, p. 491 (2 columns). Gives popular account of different forms of wheat, oat, and corn smut, and conclusions reached by Brefeld delivered in lecture before Agricultural Society of Berlin and translated in *Journal of Mycology* for 1890. Brings out the main conclusions of the author in a popular way.
272. —. The black knot of plum and cherry trees (with figs.). *American Agriculturist*, vol. L, No. 5, May, 1891, p. 281. Gives popular description of disease with recommendation to cut out and destroy all infected portions.
273. —. The soft rot of the sweet potato (with figs.). *American Agriculturist*, March 1891, vol. L, No. 3, p. 146 (2 columns). Gives popular account of trouble caused by *Rhizopus nigricans*, Ehr., with recommendation for careful handling and digging to avoid spread of the fungus. Recommends storing in warm room until all "sweating" is over.
274. —. The theory of fungicidal action. *American Agriculturist*, New York, June 1891, vol. L, No. 6, p. 323 (1 column). Discusses philosophy of fungicides in popular language. Claims action to be twofold, first by killing fungous spores at forming, and second by killing them as they germinate upon the leaf.
275. HUMPHREY, J. E. Notes on technique. II. *Bot. Gaz.* vol. XVI, No. 3, March 16, 1891, pp. 71-73. Gives account of successful use of 1 per cent solution of osmic acid in killing zoospores preparatory to staining with alcoholic solution of Hanstein's rosanilin-violet. Finds cilia even in zoospores of *Achyla polyandra* readily stained by the method.
276. —. The black knot of the plum [*Plowrightia morbosa*, (Schw.) Sacc.] (with plate). Eighth Ann. Rep. of Mass. State Ag. Ex. Station, Amherst, Mass., 1890. Issued January 9, 1891. Gives report on laboratory investigations now in progress, with carefully prepared history of the disease. Reports the malady as strictly American and first described as of fungous origin by de Schweinitz in 1831. Finds the disease distributed throughout the United States, but rare in Texas. From sowing of ascospores in agar the author has succeeded in bringing to maturity the true pycnidial form which had not previously been described. So far as the investigations have gone the author is able to connect positively only three forms, with the black knot the ascospores, the pycnidial form, differing from the pycnidial stage described by Dr. Farlow, and the summer or conidial stage. Decides the stylosporus form described by Farlow as not connected with *Plowrightia morbosa*, and fails to find the presence of the spermogonial stage of this author, but

276. HUMPHREY, J. E.—Continued.
 observes in a few cases small spore fruits which may be identical with Dr. Farlow's pycnidia.
277. ——. The cucumber mildew [*Plasmopara Cubensis*, (B. & C.)], (with plate). *Ibid.*, pp. 210-212. With history of disease. Gives account of distribution and comparison with the only other known *Peronospora* upon *Cucurbitaceæ* in the United States, *Plasmopara Australis*, (Speg) Swing. Decides both species upon the wild star cucumber (*Sicyos*) and cultivated cucumber are *Plasmopara*.
278. ——. The brown rot of stone fruits. (*Monilia fructigena*, Pers.) *Ibid.*, pp. 213-216. Reports upon laboratory investigations with the fungus, showing that mummified specimens of plums are able to carry over winter the power of reproducing abundant conidia. From cultures in agar concludes *Monilia fructigena*, Pers., as probably an autonomous fungus and likely to be readily eradicated from orchards by clean culture. Recommends concerted action in removal of infected fruits.
279. ——. Potato scab. *Ibid.*, pp. 216-220. Discusses work of other investigators upon the disease, expressing the opinion that the "deep" and "surface" scab are probably not specifically distinct. Thinks the invariable connection of the scab with a parasitic fungus has not been proved. Finds the conditions which least favor the appearance of the disease afforded by *light, open, thoroughly drained soil*.
280. ——. Damping off (with figs.). *Ibid.*, pp. 220-221. Identifies cause of disease with presence of *Pythium de Baryanum*, Hesse, and recommends prompt burning of affected plants and removal of infested soil.
281. ——. The mildew of spinach [*Peronospora effusa*, (Grev.) Rabh.]. *Ibid.* Notes disastrous presence of fungus in Massachusetts on an allied plant, *Chenopodium album*.
282. ——. The grape-vine mildew [*Plasmopara viticola* (B. & C.), Berl. & de Toni]. *Ibid.*, p. 222. Notes occurrence of the species upon *Ampelopsis veitchii* last October at Amherst, Mass.
283. ——. Potato rot [*Phytophthora infestans*, (Mont.) DBy.]. *Ibid.*, p. 223. Notes abundance in Massachusetts.
284. ——. The elder rust. (*Æcidium sambuci*, Schw.). *Ibid.*, p. 223. Notes destructive abundance on cultivated varieties of *Sambucus*.
285. ——. The rust of blackberries and raspberries (*Caoma nitens*, Schw.). Describes the disease popularly.
286. ——. The hollyhock rust (*Puccinia malvacearum*, Mont.). *Ibid.*, pp. 224-225. Gives history of the spread of the disease introduced first from Chili.
287. ——. Disease of oats. *Ibid.*, p. 225. Notes occurrence in Massachusetts of a disease of oats not caused by *Uredineæ*, and connected more or less closely with bacteria. Refers to work of Division of Vegetable Pathology upon a similar disease (see THIS JOURNAL, vol. VI, No. 2, p. 72).
288. KELLERMAN, W. A. Note on the distribution and ravages of the huckleberry branch knot (with plates). Twenty-third Ann. Meeting Kansas Academy of Science, Vol. XII, 1890 (1891), pp. 101-104. Gives counties of State from which the disease has been reported. Thinks it extends west to the limit of forest vegetation (see No. 62).
289. ——. Jensen's recent experiments. The Industrialist, Manhattan, Kans., vol. XVI, No. 35, May 23, 1891 (2 columns). Quotes at length from a letter by J. L. Jensen, of Denmark, giving results of treatment in 1890 of seed wheat and oats for smut. Jensen finds the hot-water method and Kuhn's method the only fully satisfactory ones. Quotes Jensen as concluding for four varieties treated that "there was gained by the hot-water method 1 per cent in replacing smutted heads with sound ones, but 8½ per cent as an extra benefit; perhaps mainly due to the prevention of "invisible smut." Notes

289. KELLERMAN, W. A.—Continued.
 difference in treatment between Jensen and Kellerman & Swingle, consisting in difference in time of immersion in hot water.
290. —— AND SWINGLE, W. T. Notes on sorghum smut (with plate). Report 23d Ann. Meeting Kansas Academy of Science, vol. XII, 1890, extract (1891), p. 158. Give brief account of *Ustilago sorghi*, (Link?) Passerini and *Ustilago Reiliana*, Kühn, which latter is reported for the first time in the United States.
291. ——. Additional experiments and observations on oat smut, made in 1890. Bull. No. 15, Dec., 1890, Agr'l Ex. Sta., Manhattan, Kans. (Issued March 20, 1891.) Continue work of previous year upon the subject, giving results of extended experiments in the prevention of the disease, including the test of 155 treatments of seed previous to planting. Give numerous observations as to the amount of smut, concluding from a careful estimate that there was in the State of Kansas a loss in 1890 of between 6 and 7 per cent through smut. Report superiority of Jensen hot-water treatment over all others for the prevention of the disease, requiring 15 minutes' immersion in water at $132\frac{1}{2}$ ° F., but recommend, tentatively, use of potassium sulphide one-half per cent solution, in which seed may be immersed 24 hours. Find various other chemicals while preventing the smut greatly injure the stand. Announce the discovery for the first time of a "hidden smut" which, while not apparent without tearing away the glumes, destroys the grain completely. Conclude seed from clean field will produce a crop free from smut, but if adjoining fields are smutty the oats from a clean field will in a few years become infected with the disease.
292. MAGNUS, P. Ueber das Auftreten eines *Uromyces* auf *Glycyrrhiza* in der alten und in der neuen Welt. (mit Tafel xx). Berichte der deutschen botanischen Gesellschaft. Band VIII, Heft 10, pp. 377-384, December 30, 1890. Discusses at some length the synonymy of the various species of *Uredineæ* described on *Glycyrrhiza* giving history of each description. Concludes the American species found upon *Glycyrrhiza lepidota* by various authors and variously named, to be identical with that upon *Glycyrrhiza glabra*, L., of the East. Draws the conclusion from the fact that the variation of the species of *Glycyrrhiza* has become specific and the parasite remained the same; that *Uromyces glycyrrhiza* was parasitic upon plants of the genus *Glycyrrhiza* before the separation of North America and Europe in the Tertiary period. "Ich glaube daher nicht zu viel zu behaupten wenn ich sage, dass *Uromyces glycyrrhiza* ein Parasit ist, den *Glycyrrhiza* seit den Zeiten bewohnt, da Nordamerika und Europa noch ein einheitliches Florengebiet bildeten." Gives preference to name *Uromyces glycyrrhiza*, (Rab.) Magnus, with the following synonymy: *Puccinia glycyrrhiza*, Rabh., in Klotzsch, Herb. mycologicum, No. 1396. *Uredo leguminosarum*, (Lk.) form *glycyrrhiza*, Rabh., in Flora, 1850, p. 626. *Uromyces appendiculata*, (Pers.) Rabh., in Isis, 1870, Heft IV, No. 18. *Caoma (Uredo) glumarum*, (Desm.) Sorokin, in Materialien sur Flora Mittelasiens (Bull. der Naturforschenden Gesellschaft in Moskau, 1884. *Uromyces trifolii*, (Alb. und Schwein.) Wint., in Ell. & Everhart, N. A. F., 1876. *Uromyces genistæ-tinctoriae*, (Pers.) Wint., 1887, in Acta Horti. Petropolitani, vol. x, p. 262.
293. MASSEY, W. F. Clover and cotton rust. American Agriculturist, March, 1891, vol. L, No. 3, p. 144, (‡ column). Upholds as plausible the theory of practical farmers that cotton rust spreads from clover fields lying adjacent to cotton fields.
294. MAYNARD, S. T. Fungous pests. Bull. 13, Mass. Hatch. Ex. Sta., April, 1891, pp. 3-10. Gives names of various fungi causing diseases of orchard, with formulæ for fungicides and outline of treatment of the same.
295. McCARTHY, GERALD. Copper salts a possible source of danger. Agricultural Science, vol. v, No. 6, June, 1891, La Fayette, Ind., pp. 156-158. Gives summary of results of the German scientist, Dr. Haselhoff, read in a paper before

295. McCARTHY, GERALD—Continued.

the German Association at Bremen, showing the poisonous effects of copper sulphate. The investigator finds the dry substance of plants grown in soil impregnated with copper sulphate to decrease in proportion to the quantity of that salt present. Expresses the opinion that the formulæ for the Bordeaux mixture may be modified, greatly lessening the amount of copper, and refers to work done at St. Michel Experiment Station and to experiments performed by Quantin, Mason, and others. Reports Bordeaux mixture containing one-fourth to one-eighth the usual amount of copper as giving results equivalent to the regular formula.

296. MORGAN, A. P. North American fungi. Fourth paper. Read January 6, 1891 (with plates). The Gastromycetes. The Journal of the Cincinnati Society of Natural History, Cincinnati, Ohio, vol. xiv, No. 1, Apr., 1891, pp. 5-21 (a continuation from vol. xii, p. 172, of same journal). Treats of the North American species of *Lycoperdon*, Tourn., giving generic and specific descriptions, with notes upon distribution. Describes as new *L. Peckii*, Morg.; *L. elegans*, Morg.; *L. muscorum*, Morg., and gives careful descriptions of 28 other species with frequent figures. Monographic and of great value to mycologists in the study of this genus.
297. MOSELEY, HENRY C. The chinch bug cholera. Farmers' Review, Chicago, Ill., June 3, 1891, vol. xxiii, No. 22, p. 255 (1 column). Notes appearance in Illinois of a mold upon chinch bugs and refers to work of Professor Snow on the subject (see 103).
298. PHILLIPS, W. Omitted Discomycetes. Grevillea, June, vol. xix, No. 92, p. 106. Describes *Helotium aurantiacum*, Cke., on underside of decayed leaves. U. S., J. B. Ellis, No. 75. *Lachnella albopileata*, Cke., var. *subaurata*, Ellis, on both sides of leaves of *Clethra alnifolia*, from J. B. Ellis, Newfield, N. J., U. S.
299. PEARSON, A. W. Experiments in treatment of the diseases of plants. Gard. and Forest, New York, vol. iv, No. 154, Feb. 4, 1891, p. 52. Gives, in brief, results of experiments with copper mixtures. Concludes copper acetate (2½ pounds in 25 gallons of water) as good as Bordeaux mixture for potato blight; iron sulphate ineffectual in treatment of grape diseases. Gives the formula for the mixture of copper carbonate and glue as effective against vine diseases (1 pound copper carbonate, 3 ounces glue, 25 gallons water). Reports failure to control Anthracnose with the copper mixtures.
300. PRENTISS, A. N. History of the current progress of the economic study of plant diseases. Proc. Western New York Hort. Soc., 36th Ann. Meeting, January 28-29, 1891, Rochester, N. Y., pp. 18-21. Garden and Forest, February 11, 1891, vol. iv, No. 155, p. 71. Outlines history of the study in this country, mentioning the work of Engelmann, Farlow, Burrill, Peck, Arthur, and others, calling attention to the work of the Department of Agriculture and of the Experiment Stations.
301. SCRIBNER, F. L. Fungal diseases of the grape and other plants (with numerous figures). 12mo, 134 pp., J. T. Lovett & Co., Little Silver, N. J., 1890 (issued in 1891). The author describes in clear, popular style the various diseases of plants. Gives special attention (92 pages) to the diseases of the grape. The work is especially adapted for the use of vineyardists and fruit-growers and fills a want which is rapidly growing. After a short introductory of what fungi are, the second and third chapters are devoted to black rot of grapes and its treatment. The general characteristics of the malady followed by a description of the parasitic fungus are given, together with an account of experiments made in its treatment. Chapter iv describes bitter rot (*Greeneria fuliginea*) and white rot (*Coniothyrium diplodiella*), with suggestions for treatment as in black rot. Chapter v treats of brown rot (*Peronospora viticola*). Chapter vi, powdery mildew (*Uncinula ampelopsisid*).

301. SCRIBNER, F. L.—Continued.

Chapter vii, grape leaf blight (*Cladosporium viticolum*). Chapter viii, root rot of the vine (*Agaricus melleus* and *Dematophora necatrix*), with figures from Millardet, Hartig, and Viala. Recommends immediate removal of attacked vines, thorough drainage and cleaning of ground of all vegetation for several years, and trenching about affected area for prevention of spread of disease. Chapter ix, Anthracnose and birds'-eye rot (*Sphaceloma ampelinum*). Recommends early washing of canes with 50 per cent solution of iron sulphate or 10 per cent solution of copper sulphate and dusting of vines with sulphur and powdered lime if disease appears during the growing season. Chapter x, dotted or speckled Anthracnose of the vine. Chapter xi, black rot of the apple (*Macrophoma malorum*). Chapter xii, apple rust and cedar apples (*Gymnosporangium macrosporus*). Recommends removal of cedar trees near orchard, planting of resistant varieties, and spraying with Bordeaux as soon as leaves start. Chapter xiii, apple scab (*Fusciellum dendriticum*). Gives course of treatment, recommending early spring washing with simple solution of copper sulphate (1 pound to 10 gallons of water), together with three early sprayings with the ammoniacal solution or modified eau céleste. Chapter xiv, pear scab (*Fusciellum dendriticum*). Considered by the author as only a form of this species and not specifically distinct. Chapter xv, the Entomosporium of the pear and quince (*Entomosporium maculatum*). Recommends winter treatment with copper sulphate and treatments during the growing season with Bordeaux mixture. Chapter xvi, plum rot or the Monilia of fruit (*Monilia fructigena*). Recommends clean culture and a trial of the ammoniacal solution of copper carbonate as preventive. Chapter xvii, black knot of the plum and cherry. Recommends usual method of removal of infected parts and disinfection with Bordeaux mixture. Thinks disease a fit subject for legislation. Chapter xviii, leaf-spot disease of the plum and cherry (*Septoria cerasina*). Chapter xix, powdery mildew of the cherry (*Podosphaera oxyacanthae*). Recommends use of flowers of sulphur and potassium sulphide ($\frac{1}{2}$ ounce per gallon of water). Chapter xx, peach leaf curl (*Taphrina deformans*). Chapter xxi, the fungus of the raspberry Anthracnose. Recommends winter wash for canes 50 per cent solution of iron sulphate and applications of sulphur and powdered lime in equal parts.

302. —. Powders for combating the fungous or cryptogamic diseases of plants. *Rural New Yorker*, June 13, 1891, vol. I, No. 2159, p. 453. Discusses various powders used as fungicides, recommending two for further trial, viz., sulphatine and sulpho-steatite. Refers to Circular 5 of Division of Vegetable Pathology, U. S. Dept. of Agr.
303. —. Leaf-spot of the India-rubber tree (*Leptostromella elastica*, Ellis & Scribner) with figs. *Orchard and Garden*, Little Silver, N. J., January, 1891, vol. XIII, No. 1, p. 6. Ascribes cause of the disease of *Ficus elastica* to a new species of *Leptostromella* described by Ellis & Scribner.
304. —. Leaf-spot of screw palm (*Physalospora pandani*, Ellis & Scribner) with figs. *Orchard and Garden*, Little Silver, N. J., January, 1891, vol. XIII, No. 1, p. 6. Describes the disease common upon leaves of screw palm found at Knoxville, Tenn., as caused by a new species of *Physalospora* described elsewhere.
305. —. Plum leaf of shot-hole fungus (with figs.). *Canadian Horticulturist*, Grimsby, Ontario, November, 1890, vol. XIII, No. 11, pp. 315-316. Reproduction of article in *Orchard and Garden*, giving short account of the disease.
306. —. Black knot of the plum and cherry (with plate). *Bull. Tenn. Agr. Ex. Sta.*, vol. IV, No. 1, January, 1891, pp. 26-28, Knoxville, Tenn. Describes disease and shows necessity of concerted action in stamping out the parasite.
307. SMITH, ERWIN F. Peach yellows. *Synopsis of an address at Easton, Md., January 22, 1891*. Reprint from *Proceedings of Peninsula Hort. Soc.*, p. 8.

307. SMITH, ERWIN F.—Continued.

Gives figures showing great increase of the disease in ten representative orchards in the upper part of Delaware and Chesapeake peninsula from 1887 to 1890. Reports results of inoculation experiments by budding healthy trees with diseased buds, showing the contagious nature of the malady. (These results are to be published in Bulletin No. 1 of the Division.) Answers numerous inquiries in regard to the eradication of the disease, deciding that concerted action in the matter of removal of diseased material is the best means known for the prevention of spread of the malady. States that fertilizers have been of no advantage whatever in experiments of the past three years.

308. SOUTHWORTH, EFFIE A. A new hollyhock disease (with fig. copied). Popular Gardening, December, 1890, vol. vi, No. 3, pp. 56-57. Reprint of figures and abstract of article in Journal of Mycology, vol. vi, No. 3.
309. SWINGLE, W. T. First addition to the list of Kansas Peronosporaceæ. Extract from Trans. 22d and 23d Ann. Meetings, Kansas Acad. Sci., vol. xii, Topeka, Kans., pp. 129-134 (March 30, 1891). Gives corrections and additions to original list (see THIS JOURNAL, vol. 6, No. 1, p. 41), reporting *Aenida tuberculata* as new host in the State for *Cystopus amaranti*, (S.) Berkeley, *Bidens chrysanthemoides*, Mich. as new host for *Plasmopara Halstedii*, (Farlow) Berlese and De Toni, and *Peronospora calotheca*, DBy. as a species new to the State, growing on *Galium aparine*. Notes ability of *Peronospora euphorbiæ* to withstand drought and habit of *Peronosporaceæ* in general to confine their attacks in dry weather to their commoner host plants. Reports from State, including this additional list, 33 species on 71 different hosts.
310. THAXTER, ROLAND. The Connecticut species of *Gymnosporangium* (Cedar Apples). Bull. No. 107, Conn. Ag. Exp. Sta., New Haven, Conn. (Distributed April 15, 1891.) Reports seven distinct species for the State, two upon *Cupressus thyoides*, one on *Juniperus communis*, three upon *J. Virginiana*, and one upon both *J. communis* and *J. Virginiana*. Records successful establishment of connection of *Gymnosporangium* with its proper rust in all cases but that of *G. ellisii*, and describes as new species discovered by cultures *Gymnosporangium nidus-avis*, Thaxter on *Juniperus Virginiana*, with *Rustelia* stage upon *Cydonia* (quince) and *Amelanchier Canadensis*.
311. ——. The potato scab (with plate). Report of Mycologist in 14th Ann. Rep. Conn. Ag. Ex. Sta., 1890 (1891), pp. 3-17. Discusses fully the various theories proposed to account for the disease, deciding Bruncharst's *Skurv* as specially distinct from American scab. Gives general characteristics of the disease, with account of the invariable presence when properly examined of an extremely minute fungus, resembling, with exception of its true branching fructification, some of the polymorphic bacteria. Records the entirely successful cultivation of the fungus upon various media and the life history as far as understood. Describes most striking series of successful inoculations of healthy tubers with pure cultures and with the fungus freshly removed from diseased potatoes. Inclines to the opinion that there are two species of scab, which may explain differences in results obtained by Mr. Bolley and the author (see Nos. 120-121).
312. ——. Diseases of tomatoes. *Ibid.*, p. 17. Reports *Phytophthora infestans*, DBy. *Cladosporium fulvum*, Cke., *Macrosporium tomato*, Cke., and *Fusarium lycopersici*, Sacc., as causing damage in the State of Connecticut.
313. ——. Fungous diseases of tomato worms. *Ibid.*, p. 18. Notes presence for the first time observed, of species of *Empusa* upon larva of the *Sphingidae* and the occurrence of *Empusa grylli*, form *aulica*, on *Phlegethonius Carolina* and *P. celeus*.
314. ——. Fungous diseases of grape-leaf hopper and cabbage worms. *Ibid.*, p. 19. Reports species of *Empusa* upon grape-leaf hoppers (*Tettigonia vitis*) as also liv-

314. THAXTER, ROLAND—Continued.
 ing upon the cabbage worm (*Pieris rapae*). Gives results of simple experiment which showed the identity of the two diseases as being caused by the same species of *Empusa*.
315. —. **Peronospora on cucumbers.** (*P. Cubensis*, B. & C.) *Ibid.*, p. 19. Reports occurrence at South Manchester, Conn.
316. —. **Mildew of Lima beans.** *Ibid.*, p. 19. Reports extension of *Phytophthora phaseoli*, Thax., from New Haven to Hartford and west to Norwalk. Does not find it outside of State.
317. —. **Rust of pears.** *Ibid.*, p. 20. Shows presence of *Raestelia* stage of *Gymnosporangium globosum* upon pears of the Japanese strain.
318. —. **Mildew of buckwheat.** *Ibid.*, p. 20. Reports *Ramularia rufo-maculans* on buckwheat.
319. —. **Eye rust and smut.** (*Puccinia rubigo-vera*, (DC.) Wint, and *Urocystis occulta*, Rabh.) Reports as unusually abundant.
320. —. **Some results from the application of fungicides.** (Leaf spot of quince, with plate, *Entomosporium maculatum*). *Ibid.*, pp. 21, 22. Reports successful use of Bordeaux mixture and ammoniacal solution of copper carbonate against disease, with preference for the Bordeaux.
321. —. **Black rot of grapes.** Records success in treatment of disease with Bordeaux and copper carbonate in ammonia.
322. —. **Leaf spot of plums and cherries causing defoliation.** *Ibid.*, p. 24. Records successful use of Bordeaux mixture in prevention of the disease, trees sprayed holding their leaves intact, while those unsprayed dropped their leaves in July.
323. —. **Potato blight.** *Ibid.*, p. 24. Reports successful checking of disease by the use of Bordeaux, giving comparison of $3\frac{1}{2}$ bushels per row as compared with 6 bushels sprayed. Only 5 rows were treated.
324. —. **Strawberry rust.** *Ibid.*, p. 24. Records negative experiment with fungicides in its prevention.
325. —. **Further experiments on the "smut of onion."** Continues last year's experiments and reports the flowers of sulphur sown with the seed as giving results in the ratio of 5 to 1. In a large experiment finds sulphide of calcium, muriate of potash, muriate of lime, and hyposulphite of sodium of little value, while sulphide of potassium and flowers of sulphur gave moderate results. Finds from greenhouse cultures that the first leaves of seedlings are susceptible to infection by germinating smut spores while being pushed through the ground.
326. —. **Fungicides and their application (with fig.).** *Ibid.*, pp. 26-35. Discusses methods of application, pumps, hose, nozzles, describing a convenient pump to be used with a copper tank shaped like a washboiler. Gives formulas of Bordeaux, copper carbonate, ammoniacal copper carbonate and ammonia-copper solutions made by mixing copper sulphate and ammonium carbonate together in proportions of $\frac{1}{2}$ pound of copper sulphate to 1 pound ammonium carbonate.
327. WEED, C. M. **Preventing downy mildew or brown rot of grapes (with figs.).** Bull. Ohio Ag. Ex. Sta., vol. III, No. 10, November, 1890 (issued 1891). Columbus, Ohio. Reports results of experiments in Ohio with these diseases, showing pronounced success with eau celeste and total failure with iron sulphate (copperas). Concludes eau celeste superior as preventive to ammoniacal copper carbonate.
328. WOODWORTH, C. W. **Botanical notes.** Second Ann. Rept. Ark. Ag. Ex. Sta., 1889 (published 1890), pp. 191-193. Describes in a popular way, giving remedies, pear blight, grape mildew, black rot of the grape, and sorghum blight. Claims to have discovered *Bacillus sorghi*, Burrill, while studying under Professor Burrill. Gives formulas for fungicides.

329. YEOMANS, W. H. Bean rust and other fungous diseases. Popular Gardening, November, 1890, vol. 6, No. 2, p. 27 (½ column). Popular description of diseases.
330. ZABRISKIE, J. L. The fungus *Pestalozzia insidens*, n. s. (with plate). Journal N. Y. Mic. Soc., July, 1891, vol. VII, No. 3, pp. 101-102. Describes the species as new on bark of living trees of *Ulmus Americana*. Collected near Baltimore, Md.